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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/544,787	05/26/2006	Pere Roca I Cabarrocas	0510-1120	8230

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YOUNG & THOMPSON
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EXAMINER

WHALEN, DANIEL B

ART UNIT	PAPER NUMBER
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2829

NOTIFICATION DATE	DELIVERY MODE
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12/02/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

Office Action Summary	Application No. 10/544,787	Applicant(s) ROCA I CABARROCAS ET AL.	
	Examiner DANIEL WHALEN	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) 1-10, 20 and 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-19, 22-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08/08/2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, “a top gate transistor” in claim 18 **must** be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

In response to the amended claims to overcome the claim objections, the amended claims do not completely overcome the claim objections and there are still numerous errors remaining as set forth in this office action. Appropriate correction is required. Furthermore, in addition to the claim objections shown below, Applicant's cooperation is requested in correcting any additional errors of which applicant may become aware in the pending claims.

Claim 11 is objected to because of the following informalities: For instance, in line 4, "vapor deposition methods" should be read -- a vapor deposition method --. In line 11-12, "the said crystalline fraction" is recited without proper antecedent basis. Lastly, the recitation of "forming an active material and electrodes, said active material being formed using vapor deposition methods and said transistor comprising an insulator" in lines 3-5 should be changed to -- forming an active material and electrodes on a substrate, said active material being formed using vapor deposition methods; and forming an insulator on top of said active material and electrodes -- in order to clearly recite where the active material and electrodes and the insulator are formed. Appropriate correction is required.

Claims 12-13 and 15-16 are objected to because of the following informalities: For instance, "SiO₂" in claim 12 should be written as -- SiO₂ -- for appropriate subscript. Appropriate correction is required.

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Claim 17 is objected to because of the following informalities: “the chemical elements flux and said crystallization chemical elements flux” are recited without proper antecedent basis. Appropriate correction is required.

Claim 22 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 24 is objected to because of the following informalities: “hot wire technique” should be read -- a hot wire technique --. Appropriate correction is required.

Claim 25 is objected to because of the following informalities: “radiofrequency, glow discharge technique” should be read -- a radiofrequency glow discharge technique --. Appropriate correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 12-13 and 17-19** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 12, “x” and “y” render claim indefinite since x and y are not defined. In claim 17, it is unclear what applicant is referring as “the chemical elements flux and said crystallization chemical elements flux [underlying for clarity]”. In claim 18, it is unclear how the method recited in claim 11,

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particularly wherein the microcrystalline film is formed on top of said treated interface, results in the formation of a top gate transistor. In claim 19, the recitation of "wherein one patterns the substrate" renders claim indefinite since it is not clear what applicant is referring as "one". Claims 13, which depends from claim 12, is rejected.

Insofar as definite, and as best understood, the claims are rejected as follows.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 11-19, and 22-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakata et al. (US 6,078,059; hereinafter "Nakata") in view of Roca et al. ("Stable microcrystalline silicon thin-film transistors produced by the layer-by-layer technique"; hereinafter "Roca") and Yoshinouchi et al. (US 5,403,756; hereinafter "Yoshinouchi").

5. **Re Claim 11**, Nakata teaches a method for producing a transistor for active matrix display comprising the steps of:

forming an active material and electrodes (18a,18b), said active material being formed using vapor deposition methods (sputtering) and said transistor (TFT) comprising an insulator (14), wherein, a plasma treated interface (top surface of 14) is formed on top of said insulator, and a microcrystalline film (15) is formed on top of said

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treated interface at a temperature comprised between 100 and 400°C (300°C) using at least a deposition chemical element (SiH_4) and a crystallization chemical element (H_2) (col. 8, lines 61 - col. 9, line 16).

However, Nakata does not explicitly disclose that the crystalline fraction is above 80% and that the microcrystalline silicon film comprises grains of a size between 10nm and 400nm. Regarding the crystalline fraction, Roca teaches forming a microcrystalline film, wherein the crystalline fraction being above 80% so as to obtain stable film (Abstract & Introduction). Regarding the grain size, one of ordinary skill in the art would easily recognize that the microcrystalline film is a film that formed of small grains as evidenced by Yoshinouchi teaching that the microcrystalline silicon film comprises grains of a size between 10nm and 400 nm (col. 11, lines 37-57). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Nakata with that of Roca so as to obtain stable microcrystalline film and with that of Yoshinouchi so to form the microcrystalline film.

Re Claim 12, Nakata teaches wherein said plasma treated interface is selected from the group consisting of a SiN_x layer, a SiN_xO_y layer, a SiO_2 layer and glass (col. 8, lines 61-67).

Re Claim 13, Nakata teaches wherein one forms the plasma treated interface using a gas selected from the group consisting of N_2 , O_2 , N_2O and NH_3 (col. 8, lines 61-67).

Re Claim 14, although the combined teaching of Nakata, Roca, and Yoshinouchi does not explicitly disclose using a buffer gas selected from the group consisting of Ar,

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Xe, Kr, and He for forming the microcrystalline film, one of ordinary skilled in the art would recognize that the buffer gas selected from the group consisting of Ar, Xe, Kr, and He is used as a carrier/purging gas during CVD process. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the buffer gas selected from the group consisting of Ar, Xe, Kr, and He is used as a carrier/purging gas during CVD process.

Re Claim 15, Nakata teaches wherein said crystallization chemical elements is H_2 (col. 9, lines 3-16).

Re Claim 16, Nakata teaches wherein said deposition chemical elements are selected among the group comprising SiH_4 and SiF_4 (col. 9, lines 3-16).

Re Claim 17, although the combined teaching of Nakata, Roca, and Yoshinouchi does not explicitly disclose that said deposition chemical elements flux and said crystallization chemical elements flux are at equilibrium during the growth of the microcrystalline silicon film, one of ordinary skill in the art would readily adjust the parameter during CVD deposition process to obtain optimized microcrystalline film. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the deposition chemical elements flux and the crystallization chemical elements flux are at equilibrium during the growth of the microcrystalline silicon film so as to obtain optimized microcrystalline film.

Re Claim 18, Yoshinouchi teaches wherein one forms a top gate transistor (fig. 9B).

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Re Claim 19, Nakata teaches wherein one patterns the substrate comprising a metallic layer (Ti) to form source and drain electrodes (col. 9, lines 28-32).

Re Claim 22, Yoshinouchi teaches wherein the microcrystalline silicon film comprises grains whose size ranges between 10 nm and 400 nm (col. 11, lines 37-57).

Re Claim 23, although the combined teaching of Nakata, Roca, and Yoshinouchi does not teaches a thickness of the microcrystalline silicon film between 100 nm and 450 nm, it has held that discovering an optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Furthermore, if the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not performed different than the prior art device, the claimed device is not patentable distinct from the prior art device: *In re Gardner v. TEC Systems, Inc.*, 220 USPQ 777.

Re Claim 24, although the combined teaching of Nakata, Roca, and Yoshinouchi does not explicitly disclose that the microcrystalline silicon film is produced by hot wire technique, it is conventionally known to one of ordinary skill in the art that the hot wire CVD method is a readily known CVD types that deposits amorphous or microcrystalline silicon in silicon based TFT. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the microcrystalline film is formed by a readily available HWCVD so as to form the predictable silicon layer in the TFT.

Re Claim 25, Nakata teaches wherein the microcrystalline silicon film is produced by radiofrequency glow discharge technique (RF-PCVD).

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Re Claim 26, similar to argument in claim 24, although the combined teaching of Nakata, Roca, and Yoshinouchi does not explicitly disclose that the vapor deposition methods use radiofrequency glow discharge technique, it is conventionally known to one of ordinary skill in the art that the RF-PCVD method is a readily known CVD types in silicon based TFT. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the vapor deposition methods use radiofrequency glow discharge technique so as to form the predictable active material layer in the TFT.

Re Claim 27, although the combined teaching of Nakata, Roca, and Yoshinouchi does not explicitly disclose that the vapor deposition method uses a 13.56 MHz, one of ordinary skill in the art would recognize that the frequency, 13.56 MHz, is the standard radio frequency of the plasma CVD process.

Response to Arguments

6. Applicant's argument, see page 11, last 3 paragraphs, filed 07/30/2009, with respect to non-final rejection have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as set fourth above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL WHALEN whose telephone number is

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(571)270-3418. The examiner can normally be reached on Monday-Friday, 7:30am to 5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on (571) 272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. W./

Examiner, Art Unit 2829

11/23/2009

Daniel Whalen

/Michael S. Lebentritt/

Primary Examiner, Art Unit 2829